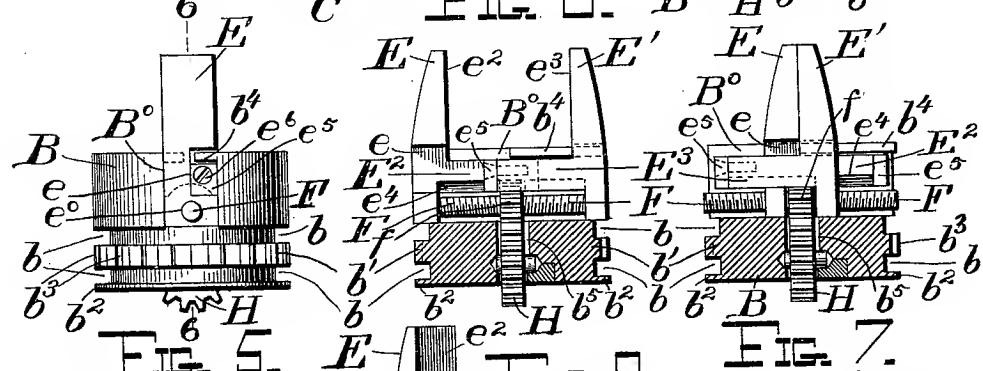
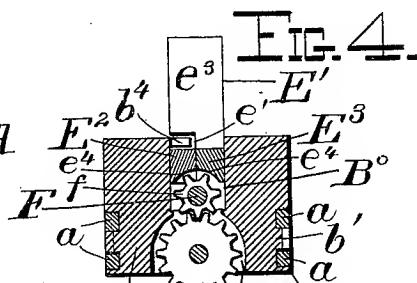
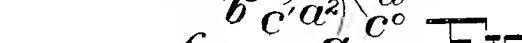
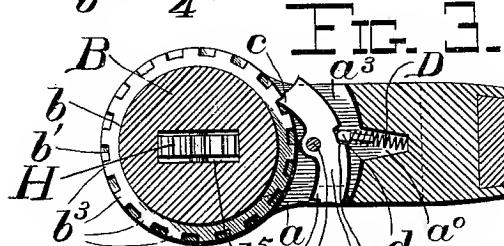
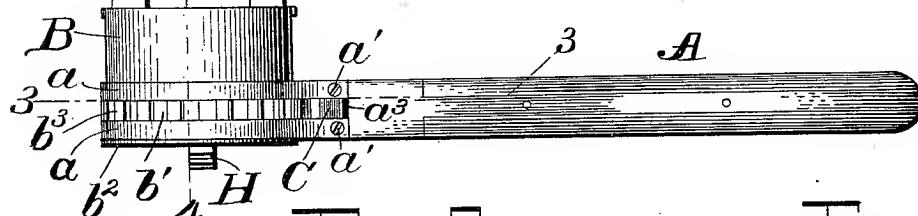
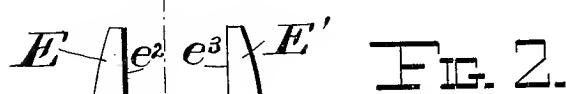
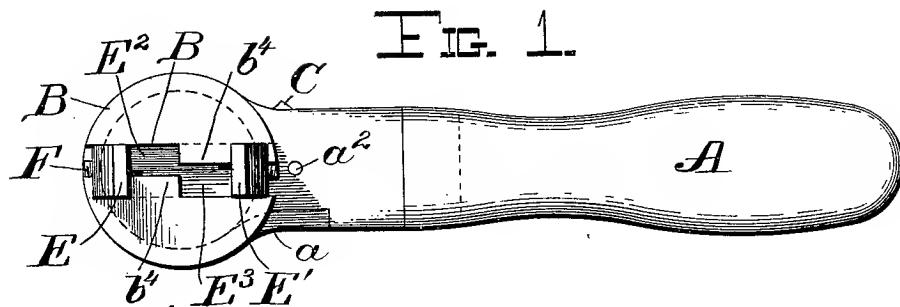


(No Model.)

R. J. MILLER.  
RATCHET WRENCH.

No. 600,158.

Patented Mar. 8, 1898.



Witnesses  
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# UNITED STATES PATENT OFFICE.

ROBERT J. MILLER, OF PLACERVILLE, CALIFORNIA.

## RATCHET-WRENCH.

SPECIFICATION forming part of Letters Patent No. 600,158, dated March 8, 1898.

Application filed May 11, 1897. Serial No. 636,064. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. MILLER, a citizen of the United States, residing at Placerville, in the county of El Dorado and State of California, have invented certain new and useful Improvements in Ratchet-Wrenches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to 10 which it appertains to make and use the same.

My invention relates to improvements in ratchet-wrenches, the object being to provide a wrench in which the handle may be brought back to recover the stroke without removing 15 the jaws of the wrench from the nut; and the said invention consists of the several parts constructed and arranged as will be herein-after fully described.

Reference is had to the accompanying drawings, in which similar letters of reference designate corresponding parts throughout the several views.

Figure 1 represents a plan view of a wrench made in accordance with my invention. Fig. 2 represents a side elevation of the same. Fig. 3 represents a horizontal section taken on the line 3 3 of Fig. 2. Fig. 4 represents a transverse section taken on the line 4 4 of Fig. 2. Fig. 5 represents an elevation of the head of 30 the wrench, looking at the ends of the jaws. Fig. 6 represents a section through the head on the line 6 6 of Fig. 5, with the jaws in their open position, showing the jaws and operating mechanism in elevation. Fig. 7 is a 35 similar view showing the jaws in their closed position. Fig. 8 is a perspective view of one of these jaws.

A designates the handle of the wrench, and B the head thereto. The head is round, or, 40 more properly speaking, in the form of a short cylinder, and is provided near one end with two annular grooves b b, a short distance apart, thus leaving an annulus b' between the two said grooves.

The handle A is bifurcated at the end adjacent to the head and is provided with two rings or straps a, adapted to fit into the grooves b b in the head B. The said rings a may be formed integral with the handle, but are left

free at one end to enable them to be sprung 50 over the lower flange b<sup>2</sup> and the annulus b' of the head B, after which their free ends may be secured to the handle by the screw a' or in any other suitable manner. By this construction the head B is held in the rings a of 55 the handle A, but is free to rotate in the said rings, as will be readily understood.

The annulus b' is provided with teeth b<sup>3</sup> around its periphery, which teeth are adapted to be engaged by either end of a double pawl 60 C, the latter pivoted on a pin a<sup>2</sup> in the bifurcated portion of the handle A, which bifurcation extends a short distance into the handle, as shown at a<sup>3</sup>, to accommodate the said pawl C. This double pawl C is pivoted at its center in such a position that either of its ends c or c' may be brought into engagement with the teeth b<sup>3</sup> on the annulus b'.

The handle A is recessed back of the pawl C, as shown at a<sup>0</sup>, the said recess opening into 70 the bifurcated portion a<sup>3</sup>, and a spring D, having a follower d in its outer end, is placed in the said recess, so that its said follower d will press in a notch c<sup>0</sup> in the back of the pawl C, as shown in Fig. 3. The notch c<sup>0</sup> is formed 75 in the middle of the back of the pawl C, and when one end, such as the end c, of the said pawl is in engagement with the teeth b<sup>3</sup> the said notch c<sup>0</sup> has passed to that side of the pivot a<sup>2</sup>, and the spring D, pressing in the 80 said notch, will keep the said end c in engagement with the teeth b<sup>3</sup>. Should the pawl now be thrown to the other side, so that the end c' thereof will engage with the teeth b<sup>3</sup>, the notch c<sup>0</sup> and the follower d will pass to that 85 side of the center and will tend to keep the end c' in engagement with the said teeth.

A diametrical slot B<sup>0</sup> is formed in the head B, extending through the said head from one side to the other, and is provided at its open 90 edges with lugs or flanges b<sup>4</sup> b<sup>4</sup>, one of which flanges is on each side of the slot, and they extend from near the middle of the slot to opposite ends of the same.

The jaws E and E' of the wrench are formed 95 as shown in Fig. 8, and are mounted in the slot B<sup>0</sup> in the head, from which they extend outwardly, with their straight edges e<sup>2</sup> and e<sup>3</sup>

facing each other, as shown in Fig. 2, to receive the nut. The portions of the jaws extending into the slot  $B^0$  are cut out on one side, as at  $e$  and  $e'$ , and are each provided 5 with guide-bars  $E^2$  and  $E^3$ , extending at right angles between the said jaws, which guide-bars, when the jaws are in their proper position in the slot  $B^0$ , are arranged side by side, pointing in opposite directions, and will pass 10 through the cut-out places  $e$  and  $e'$  of the opposite jaws as the said jaws are moved toward each other. The inner end of each jaw is tapped, as at  $e^0$ , below the said cut-out portion, one jaw having a right-hand thread and 15 the other a left-hand thread. A right and left hand screw  $F$  is arranged within the slot  $B^0$ , with one end extending into each of the tapped perforations in the jaws, so that when the said screw  $F$  is turned the jaws will be 20 moved toward each other or away from each other, accordingly as the said screw is rotated in one or the other direction.

A pinion  $f$  is formed integral with or rigidly mounted upon the screw  $F$ , at the center thereof, and meshes with a toothed wheel  $H$ , journaled in an opening  $b^5$ , formed through the head  $B$  and opening into the slot  $B^0$ . This toothed wheel  $H$  extends through the back of the head  $B$  and serves as a thumb-wheel by 25 means of which the screw  $F$  may be turned to open or close the jaws  $E$  and  $E'$ .

The guide-bars  $E^2$  and  $E^3$  are rounded out along their inner adjacent corners, as shown at  $e^4$ , to allow them to pass freely over the 30 pinion  $f$ , and each of said guide-bars is provided with a stop-piece  $e^5$ , secured to the end thereof, one corner of which stop-piece extends over the cut-out portions  $e^4$  and abuts against the pinion  $f$  and prevents further 35 movement thereof when the jaws are open to their extreme limit, as shown in Fig. 6. These stop-pieces  $e^5$  are preferably made separate and secured on the ends of the guide-bars  $E^2$  and  $E^3$  by means of screws  $e^6$  or in any other 40 suitable manner so as to be readily removed and replaced when the jaws are inserted in the slot or removed therefrom; but, if desirable, one of the end pieces may be formed integral with the guide-bar, as it will be necessary to remove only one of the said end pieces 45 in order to insert or remove the jaws from the slot. When the jaws  $E$  and  $E'$  are in their proper positions in the slot  $B^0$ , the opposite ends of the right and left hand screw 50  $F$  are in the tapped openings  $e^0$  in the ends of the jaws. The guide-bars  $E^2$  and  $E^3$  are 55 side by side above the pinion  $f$  and below the flanges  $b^4$  at the edges of the slot  $B^0$ , which flanges prevent the jaws from being thrown 60 out of the slot, and the said flanges also extend into the cut-out portions  $e$  and  $e'$  of the jaws, which latter cut-out portions are long enough to accommodate the bar from the opposite jaw and one of the said flanges  $b^4$ , as shown 65 in Fig. 5.

The operation of the device is as follows: The jaws are adjusted to the nut to be turned by turning the toothed wheel  $H$ , which serves also as a thumb-wheel and in turn rotates the pinion  $f$  and the right and left hand screw  $F$ , which will move the jaws  $E$  and  $E'$  toward each other or away from each other, according to the direction of rotation of the said screw. Having adjusted the jaws upon the nut, the handle is oscillated about the axis 75 of the head  $B$ , the rings  $a$  turning freely in the grooves  $b$  in the said head as the handle moves in one direction and the pawl  $C$  engaging the teeth  $b^3$  on the annulus  $b'$  and turning the head and nut as the handle moves in 80 the reverse direction. The direction of rotation of the head can be reversed by turning the pawl  $C$  so that its other end will engage the teeth  $b^3$  on the annulus  $B'$ .

Having thus described my invention, what 85 I claim, and desire to secure by Letters Patent of the United States, is—

1. In a wrench of the character described the combination with a handle, of a head free to turn in said handle, movable jaws mounted 90 in the said head; a right and left hand screw passing through the said jaws, a pinion on the said screw; a toothed wheel meshing with the said pinion and adapted to turn said screw, and a pawl-and-ratchet connection between the handle and head, substantially as described.

2. In a wrench of the character described, the combination with a handle, of a head free to turn in the said handle and having a slot 100 therethrough; flanges on the edges of the said slot; a pair of jaws mounted in the said slot; guide-bars on the said jaws beneath the said flanges; a right and left hand screw extending through the said jaws; a pinion on said 105 screw; a toothed wheel meshing with the said pinion for turning the said screw; and a pawl-and-ratchet connection between the said handle and head, substantially as described.

3. In a wrench of the character described, the combination with a handle; a plurality of rings secured to the said handle; and a spring-actuated pawl mounted in the said handle; of a head having a diametrical slot therethrough, and a plurality of annular 115 grooves thereon adapted to receive the said rings; a pair of movable jaws mounted in said slot; a right and left hand screw mounted in said slot and passing through the said jaws; a pinion on said screw; a toothed wheel 120 meshing with said pinion for turning the said screw to adjust the said jaws, and teeth on the said head adapted to be engaged by the said pawl in the handle, substantially as described.

4. In a wrench of the character described, the combination with a handle, of a head free to turn in the said handle and having a diametrical slot therethrough; flanges on the edges of the said slot; jaws mounted in the 125 130

said slot; guide-bars on the said jaws beneath the said flanges; stop-pieces on the ends of the said bars adapted to limit the movement of the said jaws; a right and left hand screw 5 extending through the said jaws; a pinion on said screw; a toothed wheel meshing with said pinion for turning the said screw, and a pawl-and-ratchet connection between the said handle and head, substantially as described.

In testimony whereof I affix my signature to in presence of two witnesses.

ROBERT J. MILLER.

Witnesses:

CHAS. H. WENTHENOUX,  
ABE DARLINGTON.